substitute for the consumer interface offered by the OSP. In contrast, we can envision no way collect calls can be handled without the customer dealing with two operators.

Consider the day BPP becomes operational. At that time functions will be carried out in LEC switches that were done in the OSP switches the day before. OSP plant will be idled. Our 15 cent-per-call cost can be regarded as reflecting some of the costs of the duplicate plant required for a transition to BPP.

Each minute of talking on a call routed using BPP uses resources that are not required for most telephone calls today. The call ties up transmission links running from the local switch to the LEC OSS and ties up a connection in the OSS. The costs for these capabilities are similar to the costs for access traffic that is routed through a tandem access. For our base-case analysis, we estimate that the average cost of such routing and switching is about 0.44 cents per minute. Earlier we discussed our derivation of this estimate from the costs of tandem usage. In addition, setting up the additional trunking plant needed to carry the traffic from each local switch to the LEC OSS will impose some one-time costs. For our base-case analysis, we estimate the number of trunks required by dividing the estimated BPP traffic by the capacity of a typical trunk (5,000 minutes/month is a reasonable value, in our experience) and multiplying that by a per-trunk rearrangement cost of $100.

In addition to the upgrades on the end-office exchange switches, the LECs will also have to upgrade their OSS switches to match the upgrades made at the local switches. We estimate that there are about 184 such switches (roughly one for each of 164 LATAs plus 20 for the non-Bell companies). Based upon our OSS7 inquiries, we understand that upgrading the OSS to be BPP-capable will cost about $1,000,000 per switch. Sprint's comments project that upgrading 25 sites to ABBS functionality and OSS7 capability will cost

($7.1 + $11.5 + $15.7) = $34.3 million or $1.4 million per switch.[15] Notice that we are only concerned here with the one-time upgrade costs that are not traffic-related. Traffic-related costs are detected in our consideration of calls and minutes of use.

IXCs will also have to modify their networks to accommodate the changes in signalling required to support BPP. The FCC's Further Notice estimates that the IXCs will have one-time costs of $120 million to upgrade their networks to support BPP. The FCC divides these costs into $94 million for AT&T/MCI/Sprint and $26 million for all other carriers. We find it difficult to predict the behavior of the smaller IXCs. Some may drop out of the operator services market because they cannot afford the costs to upgrade or because their switch manufacturer does not offer the upgrade to support BPP.[16] Others may find ways to contract with third parties to provide this service. While we think the FCC's numbers here are conservative — we believe that actual costs to IXCs will be higher — they are appropriate for our base-case analysis.

As discussed below, we assume that BPP will apply to those CAPs that provide switched access services. CAPs have deployed relatively few switches, but they are in the process of deploying more. For our 1997 base-case, we estimate that 50 CAP switches would be affected, and that their switch upgrade costs (on a per-switch basis) would be the same as for LECs. We are uncertain about the number of subscribers CAPs will have in 1997, and, to a first approximation those customers are counted in our analysis of LEC customers. Hence, we do not consider any subscriber-related costs for CAPs.

A possible additional cost, not considered in our analysis, might be incurred by those credit card suppliers who choose to interconnect their databases with the BPP system. These firms would also incur development and computer system costs. For example, they would have to

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[15] Sprint Comments, pp. 27-28.

[16] Our methodology does not assign any social cost to this possible loss of competition.

modify their databases to store information on the preferred long-distance carrier. We estimate that approximately 10 such firms (e.g., American Express, VISA, MasterCard, Discover, some major oil companies) would choose to interconnect, and thereby make it easier for their customers to use their credit cards to place long-distance calls.[17]

We also believe that BPP will apply to cellular and PCS carriers. The FCC has licensed roughly 1,500 cellular systems. However, these are served by far fewer than 1,500 cellular switching systems. We estimate that 200 existing cellular switches would need to be upgraded to support BPP. The number we use, 200, is a low estimate of the number of cellular switches today — let alone the number of cellular and PCS switches in 1997. We use the same $75,000 per switch upgrade cost as we used for LEC switches. We believe that this figure is low since many cellular switches are not yet equipped for SS#7. Additionally, some cellular switch vendors may choose not to develop the necessary software in a timely manner. In that event, the cellular system operator would be required to replace the switch in order to support BPP.

The table below summarizes our base-case estimates of the one-time and recurring network costs that would be caused by the implementation of BPP.

[17] Today it is possible to charge an OSP call to a Visa card by dialing an access code (10XXX) and then telling the operator that you wish to use a Visa card.

Cost-Causing Element	Number	Network Costs	
		One Time	Recurring
Access Lines	143,325,000		
LEC Central Office Switches			
RHC Equal Access	8,751	$656,325,000	
RHC Non-Equal Access	721	$7,210,000	
Independent Equal Access	8,061	$604,575,000	
Independent Non-Equal Access	4,103	$41,030,000	
Calls using BPP	2,858,880,383		$428,832,057
Minutes of Use Via BPP	21,339,500,000	$35,565,833	$94,107,195
LEC OSS Switches	184	$184,000,000	
Larger IXCs	NA	$94,000,000	
Smaller IXCs and OSPs	NA	$26,000,000	
CAP Switches	50	$3,750,000	$375,000
Cellular/PCS Carrier Switches	200	$15,000,000	$1,500,000
Consumer Surplus Loss	NA		
Total		$1,667,455,833	$524,814,252

D. Administrative Costs

Implementing BPP will require the LECs to determine their customers' preferred long-distance carrier for calls routed using BPP. The Commission has tentatively determined that

LECs should use a balloting process, similar to that used in the original selection of presubscribed long-distance carriers, to ascertain these preferences.

Such a balloting process will impose significant administrative costs. For our base-case analysis, we estimate that it will cost a LEC roughly one-half dollar per access line to prepare a ballot and another one half dollar for each ballot received and entered into the data base. Additionally, we expect that a significant fraction of consumers (we use 20 percent) will find the ballot confusing or unclear and will choose to call the LEC for further assistance. We assume that such calls will impose costs of $1.50, on average. Additionally, churn occurs. Consumers move and need to resubscribe to local exchange service, at which time they must redesignate their long-distance carrier. We assume that one-fifth of all households are involved in such churn each year and impose similar balloting and confusion costs. Under these assumptions, LECs have a one-time administrative cost of $91 million and recurring costs of about $7 million per year.

Other carriers will have similar costs. While such costs are low for entities such as CAPs that have few subscribers, cellular carriers have about 20 million subscribers today and will have far more by 1997 and can be expected to incur significant administrative expenses. We use the same model for cellular carriers as we use for LECs. However, we assume that cellular carriers face greater churn than do local exchange carriers. Our base-case estimate is that cellular carriers will have one-time administrative expenses of $36 million and recurring expenses of about $6 million.

The 1997 subscribership levels of CAPs and other local service providers are uncertain at this time. Additionally, some subscribers to CAP services can be expected to discontinue LEC service. Given these two factors, we do not believe it is necessary to include any administrative costs for CAPs in our base-case model.

E. Marketing Costs

BPP will significantly remake the long-distance market. The Commission estimates that operator services will serve about eight billion dollars of away-from-home telephone traffic in 1997 of which roughly half will be dial-around traffic using access codes.[18] Additionally, there are the operator calls dialed from home. We estimate that the total market at stake has a value of about $11 billion per year. Eleven billion dollars is a lot of long-distance traffic. It is bigger than MCI's traffic was in 1990 or Sprint's traffic is today. One can expect vigorous marketing competition for this valuable traffic. If balloting were required, we would expect all long-distance carriers to strongly contest this traffic. If one assumes that the average life of a balloted customer is five years and that BPP would replace access code dialing,[19] then the total sales at stake would amount to roughly $50 billion (more than a year's sales for AT&T).

We believe that it would be rational for the IXCs to spend substantial amounts to influence the outcome of the balloting — in the range of three to ten percent of the five-year revenues at stake. In our base-case analysis, we use three percent of five year BPP away-from-home revenues as our estimate of IXC marketing costs associated with the balloting process, weighted by the response rate we expect from the balloting process. We exclude at-home calls routed using BPP, since those calls today are routed according to 1+ presubscription — and the IXCs incur marketing expenses today influencing the choice of 1+ carrier. We weight the total revenues at stake by the expected ballot response rate (20 percent in our base case) because we think this better models the choices facing the IXCs. As an extreme case, suppose we knew in advance that 99 percent of subscribers would throw away their BPP ballots, then incentives for the IXCs to promote their services during the balloting process

[18] FNPRM, Footnote 25.

[19] The average turnover of presubscribed long-distance customers, measured as the fraction of customers who change their carrier in any one year is higher than would be indicated by a five year average life. But, we believe that the churning population includes frequent shoppers who change carriers more frequently than average.

would be greatly reduced. (This analysis assumes that the default choice for consumers not returning a ballot is their 1+ carrier.)

We also believe that continuing marketing expenses in pursuit of BPP traffic would lie in the range of 8 to 20 percent of the annual revenues at stake. We note that MCI's selling and administrative expenses for 1993 were 28 percent of sales.[20] If we allow 10 percent for administrative expense, then MCI's selling expenses run to 18 percent of sales. Sprint's recent comments in this proceeding showed that it was willing to spend more than 20 percent of the revenues associated with an aggregator to obtain that aggregator's traffic.[21] To be very conservative, we will use eight percent times the revenues at stake as our base-case estimate of the annual marketing and customer service expense associated with implementation of BPP. If we use our 1997 revenue estimate ($11 billion), then the estimated annual IXC marketing expenses associated with this traffic would be $0.9 billion. If we focus on away-from-home calling and exclude dial-around traffic, as seems reasonable, then marketing dollars would amount to $312 million per year. This is our base-case estimate of the recurring marketing costs associated with BPP. These marketing costs are not really new to the IXCs. For example, OSPs pay commissions to premises owners. Those play much the same role as commissions to sales agents or advertisements on television. The FCC's analysis treated the reduction in such commissions as a benefit to consumers.[22] Even if this were correct it would still be appropriate only if corresponding expenses in the BPP world are added back in as a cost to the consumer. And, of course, as discussed more below, under BPP real costs replace transfer payments.

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[20] MCI Communications Corp., Income Statement for 12/93, downloaded from Disclosure, Inc., September 8, 1994.

[21] See Sprint Comments, pp. 19, 20.

[22] We have repeatedly pointed out how this consumer benefit is matched by an "un-benefit" to the recipient of the commissions.

Additionally, we would expect that credit card suppliers (e.g., American Express, banks) would engage in similar marketing campaigns (mostly through bill staffers and direct mail) to encourage their card holders to undertake the administrative steps necessary to use their cards to charge long-distance calls.[23]

F. Consumer Costs

Implementing BPP will impose burdens on consumers that they would not otherwise bear. Reading, understanding, and responding to the ballots and the continuing requests to specify the primary carrier for BPP purposes is the largest active task facing consumers. In our base-case, we assume that; on average, consumers are able to read the ballot, pick a carrier, complete the ballot and put it in the return envelope in two minutes; a reasonable value for consumer time is ten dollars per hour; and there are 0.77 consumers per access line (to allow for multiline business subscribers). Based upon these assumptions, we calculate that the consumer burden of the balloting task is a one-time cost of $37 million and a recurring cost of about $7 million per year.

Applying a similar calculation to cellular, assuming 44 million subscribers (30 percent annual growth for three years from today's 20 million subscribers) and making no allowance for multiple lines per subscriber, yields a one-time cost of about $15 million and recurring costs of about $6 million per year.

Implementing BPP will also impose a hidden burden (on subscribers) that is not immediately apparent, and which depends upon the specific method of BPP cost recovery, which is not settled at this time. Additionally, the separation rules will cause many of the costs of BPP to

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[23] These costs would be reduced if the FCC did not require commercial credit card suppliers to conduct balloting and instead permitted the credit card supplier to specify the preferred long-distance carrier. Under those circumstances a credit card/PIN combination would become useful for charging telephone calls dialed using 0 as soon as the credit card supplier interconnected with the SS#7 network. This approach would allow the credit card company to get a commission from the IXC and thus makes it much more likely that the credit card company would wish to participate. This case illustrates the fallacy in the Commission's logic. The customer is better off, for sure, since this is an additional option. Yet, the "costs" (i.e., the commissions) also increase.

fall into the state jurisdiction, and it is even less clear what rules will govern recovery of those costs. If the costs of BPP are recovered only from BPP services, the costs per call may be so high that BPP may enter into a "death spiral," with IXCs strongly promoting the use of access codes.

If BPP network implementation costs were recovered generally as part of all access, they would raise per-minute access charges slightly. This increase in access costs would be seen by all IXCs and would be passed on to their customers. Demand for long-distance is moderately elastic and usage of long-distance would therefore fall off slightly. This fall-off would create a loss in consumer welfare. We estimate that, for each additional dollar of access charges, consumers lose $0.16 in benefits (in addition to the $1 payment for access). This elasticity, or repression effect, is discussed further in Appendix B, where the 0.16 factor is derived. Using this 0.16 factor to estimate the welfare effects of long-distance repression, we estimate in our base case that implementing BPP would cause welfare losses of $164 million per year.

G. Summing Up

Implementing BPP would impose a wide range of costs on our economy. The following table displays these costs for our base case.

Strategic Policy Research — BPP Total Social Costs Worksheet Scenario: Base Case (Match FNPRM)

version of 09:19 13-Sep-94

Input Data

Short Name	Value	Description
OSPMOU	32,830,000,000	Total Minutes of OSP Traffic (32.8 billion follows the growth rate in FNPRN, note 25 and 25.5 billion minutes reported in 1991 TOSCIA Report)
BPPCallDuration	7.46	Average Duration of a BPP Call. Our value of 7.46 is based on Lande report, Table 4 (20.9/2.8) (minutes/calls)
BPPCallPrice	$0.34	Price per minute to end-user of calls placed under BPP
FAwayFromHomeOSP	70.0%	Fraction of OSP calls that are made "away-from-home"
FDialAround	50.0%	Fraction of "away-from-home" calls that dial-around 0+ access (we assume no dial around at home)
AccessLines	143,325,000.00	Total number of LEC Access lines (from USTA 93, p. 2)
RHCEA	8,751	Number of RHC equal access switches (from USTA 93, p. 12)
RHCnotEA	721	Number of RHC non equal access switches (from USTA 93, p. 12)
IndEA	8,061	Number of independent equal access switches (from USTA 93, p. 12)
IndnotEA	4,103	Number of independent non equal access switches (from USTA 93, p. 12)
LECOSSSW	184	Number of LEC OSS switches (SPR estimate one per LATA plus 20)
OT$perSPCOffice	$75,000	One-time expenditures required to upgrade a stored-program controlled office to BPP (calculation assumes SPC office= EA office)
OT$pernonSPCOffice	$10,000	One-time expenditures required to upgrade a non stored-program controlled office to BPP
MOUperTrunk	5,000	Minutes of traffic carried by an average end-office -- OSS trunk in a month
OT$perTrunk	$100	The one-time (rearrangement) costs for added voice-grade trunk from an end-office to a OSS switch
OT$perLECOSSSwitch	$1,000,000	The one-time costs of upgrading a LEC OSS switch to support BPP
AddSetupCostsperBPPCall	$0.15	The average additional costs imposed by the process of setting-up a BPP call
AddCostPerBPPMou	$0.0044	The average additional per minute BPP cost. $0.0044 = 0.49 cents per minute (Bell Atlantic tandem cost) times 0.9
NetCostLargerIXC	$94,000,000	One-time network costs for larger IXCs, see FCC FNPRMM para 28
NetCostSmallIXCs	$26,000,000	One-time network costs for smaller IXCs, see FCC FNPRMM para 28
CapSwitches	50	Number of CAP switches that will have to be modified by 1997
CellularPCSSwitches	200	Number of cellular, PCS, SMRS switches that will have to be upgraded or modified by 1997
AnnualGrowthRateCellularPCSswitches	0.1	The assumed growth rate for Cellular/PCS/CAP switches.
OT$IXCMarketing	3.0%	The IXC marketing expense associated with the balloting/open season for 0+ presubscription as a fraction of five years BPP revenues for customers who return ballots
IXCMarketingFOSPCallRevs	8.0%	Continuing IXC marketing expense as a fraction of total BPP revenues
CustperLoop	0.77	The ratio of customers to access lines (allowance for multi-loop customers)
CostBallotSent	$0.50	The cost to a LEC for each ballot mailed
CostBallotReturned	$0.50	The cost to a LEC for processing each returned ballot
CostperInquiry	$1.50	The cost to the LEC for processing each telephone inquiry regarding the 0+ equal access ballot process
FSubsReturningBallot	20.0%	The fraction of subscribers returning ballots
FSubsMakingInquiry	15.0%	The fraction of subscribers inquiring about the 0+ ballot process
LECAnnualChurn	20.0%	The fraction of LEC customers who subscribe anew to service each year (moves, etc.)
CellularAnnualChurn	40.0%	The fraction of cellular customers who subscribe anew to service each year (moves, etc.), change cellular carriers or change IXCs
CellularCustomers	43,940,000	The number of cellular/PCS customers (assume 30 percent growth for three years from 20 million base)
ConsumerTime$	$10	The value of consumer's time (dollars/hour)
ConsumerMinperBallot	2	The average number of minutes it takes a consumer to read and understand a ballot, and, if motivated, fill out it out, insert and mail and/or inquire about ballot.
AmortFactor	0.3	The amortization/depreciation factor used to convert one-time network expenses to annualized costs
SocialInterest	0.05	The amortization factor used to convert other one-time expenses to annual charges.
ElasticityEffectFactor	0.16	The elasticity effect coefficient -- the ratio of consumer welfare loss from increased long-distance charges to increases in access charges

Results

Cost-Causing Element	Number	Network Costs		Marketing Costs		Administrative Costs		Consumer Response	
		One Time	Recurring	One Time	Recurring	One Time	Recurring	One Time	Recurring
Access Lines	143,325,000					$90,956,250	$7,166,250	$36,750,000	$7,350,000
LEC Central Office Switches									
RHC Equal Access	8,751	$656,325,000							
RHC Non-Equal Access	721	$7,210,000							
Independent Equal Access	8,061	$604,575,000							
Independent Non-Equal Access	4,103	$41,030,000							
Calls using BPP	2,858,880,383		$428,832,057						
Minutes of Use Via BPP	21,339,500,000	$35,565,833	$94,107,195						
LEC OSS Switches	184	$184,000,000							
Larger IXCs	NA	$94,000,000		$217,662,900	$312,541,600				
Smaller IXCs and OSPs	NA	$26,000,000							
CAP switches	50	$3,750,000	$375,000						
Cellular/PCS Carrier Switches	200	$15,000,000	$1,500,000			$36,250,500	$5,712,200	$14,646,667	$5,858,667
Consumer Surplus Loss	NA								$164,008,160
Total		$1,667,455,833	$524,814,252	$217,662,900	$312,541,600	$127,206,750	$12,878,450	$51,396,667	$177,216,827

Total one time costs	$2,063,722,150	
Total recurring costs	$1,027,451,129	per year
Total annualized costs	$1,547,501,195	per year
Cost per call routed using BPP	$0.54	per call
Cost per "away-from-home" BPP call	$1.01	per call
Cost per minute of BPP traffic	$0.07	per minute
Cost per "away-from-home" BPP minute of use	$0.13	per minute
Network costs for "away-from-home" BPP calls	$0.67	per call
LEC network cost for "away-from-home" BPP calls	$0.64	per call
Total cost per access line	$0.90	per month
LEC network cost per access line	$0.57	per month

OSP traffic division under this scenario

Category	Annual Minutes	Calls	Value
BPP at home	9,849,000,000	1,319,483,254	$3,348,660,000
BPP away from home	11,490,500,000	1,539,397,129	$3,906,770,000
Dial around (access code)	11,490,500,000	1,539,397,129	$3,906,770,000
Total OSP	32,830,000,000	4,398,277,512	$11,162,200,000
Total BPP	21,339,500,000	2,858,880,383	$7,255,430,000

This analysis shows total one-time costs of roughly $2 billion and recurring costs of $1 billion. If we annualize the one-time network expenses using the same 0.3 capital recovery factor as used by the Commission in the FNPRM and annualize all other one-time costs using a 0.05 social interest rate and add those costs to the recurring costs of BPP, then we get total annualized costs of roughly $1.5 billion per year.[24] We estimate that BPP will impose recurring costs of more than a dollar on each call that benefits from BPP (all away-from-home BPP calls).

The analysis in the FCC's FNPRM considered only a few of these costs and identified LEC costs of $380 million per year and OSP costs of $35 million per year. Much of the discrepancy can be tracked to a few points. First, the FCC included no cost for IXC marketing. This cannot be right. Currently, the IXCs appear to be willing to spend as much as 20 percent of the revenues from a pay phone location to obtain that traffic. We believe that incentives for marketing expenses would persist after BPP was implemented, although the form of the expenditures would change. Second, the Commission's analysis did not include consideration of the economic waste from higher access charges. But, obviously, the costs of BPP must be recovered somewhere. Those higher rates will deter some consumers from long-distance usage that they would have otherwise enjoyed. Third, the Commission's analysis assumed that the duplicate use of two OSS switches to handle a call adds no costs to the call-setup process. We find that hard to believe. In our base case analysis, we assume that this duplicate processing will add 15 cents to the costs of handling the average 0+ call. Finally, we believe that the FCC's process of estimating the network costs of BPP (adding up the costs reported by all parties that filed) was flawed. Not all affected LECs filed.[25] Errors

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[24] This calculation annualizes the one-time costs associated with marketing, administration or consumer response using a lower rate than is used for capital expense. This lower rate reflects only a social interest rate and does not include any maintenance or depreciation elements.

[25] We note that AT&T in its recent comments in response to the FNPRM stated that "the FNPRM completely ignores $120 million in BPP cost estimates submitted by SNET and the Sprint LECs." AT&T comments, p. 19.

in the filing of any one party were passed straight-through to the output. Our top-down analysis provides a counterpoint to the aggregated bottom-up estimates of others.

III. Costs of BPP Under Alternate Scenarios

The preceding section presented our base-case analysis — the costs given by applying our methodology and our estimates of the various costs associated with BPP to a scenario which matches, as best we could, the assumptions contained in the analysis in the FNPRM.

However, it is interesting and useful to vary the scenario in order to understand the effects of variations in the assumptions. We consider the following scenarios

- High levels of dial-around by 1997
- Very low levels of dial-around by 1997
- Extremely low cost assumptions
- A no-balloting scenario
- A pessimistic set of assumptions.

A. The Nynex Scenario — High Dial-Around by 1997

Nynex observed in their comments that they are already observing dial-around levels higher than the FCC assumed for 1997 and projected that dial-around levels would reach 80 percent by 1997. If we keep all other variables in our model at the base-case level, but increase dial-around to 80 percent, then we get the results shown on the next page.

Strategic Policy Research — BPP Total Social Costs Worksheet Scenario: Nynex's High Dial Around (80%)

version of 09:27 13-Sep-94

Input Data

Short Name	Value	Description
OSPMOU	32,830,000,000	Total Minutes of OSP Traffic (32.8 billion follows the growth rate in FNPRN, note 25 and 25.5 billion minutes reported in 1991 TOSCIA Report)
BPPCallDuration	7.46	Average Duration of a BPP Call. Our value of 7.46 is based on Lande report, Table 4 (20.9/2.8) (minutes/calls)
BPPCallPrice	$0.34	Price per minute to end-user of calls placed under BPP
FAwayFromHomeOSP	70.0%	Fraction of OSP calls that are made "away-from-home"
FDialAround	80.0%	Fraction of "away-from-home" calls that dial-around 0+ access (we assume no dial around at home)
AccessLines	143,325,000.00	Total number of LEC Access lines (from USTA 93, p. 2)
RHCEA	8,751	Number of RHC equal access switches (from USTA 93, p. 12)
RHCnotEA	721	Number of RHC non equal access switches (from USTA 93, p. 12)
IndEA	8,061	Number of independent equal access switches (from USTA 93, p. 12)
IndnotEA	4,103	Number of independent non equal access switches (from USTA 93, p. 12)
LECOSSSW	184	Number of LEC OSS switches (SPR estimate one per LATA plus 20)
OT$perSPCOffice	$75,000	One-time expenditures required to upgrade a stored-program controlled office to BPP (calculation assumes SPC office= EA office)
OT$pernonSPCOffice	$10,000	One-time expenditures required to upgrade a non stored-program controlled office to BPP
MOUperTrunk	5,000	Minutes of traffic carried by an average end-office -- OSS trunk in a month
OT$perTrunk	$100	The one-time (rearrangement) costs for added voice-grade trunk from an end-office to a OSS switch
OT$perLECOSSSwitch	$1,000,000	The one-time costs of upgrading a LEC OSS switch to support BPP
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AddCostPerBPPMou	$0.0044	The average additional per minute BPP cost. $0.0044 = 0.49 cents per minute (Bell Atlantic tandem cost) times 0.9
NetCostLargerIXC	$94,000,000	One-time network costs for larger IXCs, see FCC FNPRMM para 28
NetCostSmallIXCs	$26,000,000	One-time network costs for smaller IXCs, see FCC FNPRMM para 28
CapSwitches	50	Number of CAP switches that will have to be modified by 1997
CellularPCSSwitches	200	Number of cellular, PCS, SMRS switches that will have to be upgraded or modified by 1997
AnnualGrowthRateCellularPCSswitches	0.1	The assumed growth rate for Cellular/PCS/CAP switches.
OT$IXCMarketing	3.0%	The IXC marketing expense associated with the balloting/open season for 0+ presubscription as a fraction of five years BPP revenues for customers who return ballots
IXCMarketingFOSPCallRevs	8.0%	Continuing IXC marketing expense as a fraction of total BPP revenues
CustperLoop	0.77	The ratio of customers to access lines (allowance for multi-loop customers)
CostBallotSent	$0.50	The cost to a LEC for each ballot mailed
CostBallotReturned	$0.50	The cost to a LEC for processing each returned ballot
CostperInquiry	$1.50	The cost to the LEC for processing each telephone inquiry regarding the 0+ equal access ballot process
FSubsReturningBallot	20.0%	The fraction of subscribers returning ballots
FSubsMakingInquiry	15.0%	The fraction of subscribers inquiring about the 0+ ballot process
LECAnnualChurn	20.0%	The fraction of LEC customers who subscribe anew to service each year (moves, etc.)
CellularAnnualChurn	40.0%	The fraction of cellular customers who subscribe anew to service each year (moves, etc.), change cellular carriers or change IXCs
CellularCustomers	43,940,000	The number of cellular/PCS customers (assume 30 percent growth for three years from 20 million base)
ConsumerTime$	$10	The value of consumer's time (dollars/hour)
ConsumerMinperBallot	2	The average number of minutes it takes a consumer to read and understand a ballot, and, if motivated, fill out it out, insert and mail and/or inquire about ballot.
AmortFactor	0.3	The amortization/depreciation factor used to convert one-time network expenses to annualized costs
SocialInterest	0.05	The amortization factor used to convert other one-time expenses to annual charges.
ElasticityEffectFactor	0.16	The elasticity effect coefficient -- the ratio of consumer welfare loss from increased long-distance charges to increases in access charges

Results

Cost-Causing Element	Number	Network Costs		Marketing Costs		Administrative Costs		Consumer Response	
		One Time	Recurring	One Time	Recurring	One Time	Recurring	One Time	Recurring
Access Lines	143,325,000					$90,956,250	$7,166,250	$36,750,000	$7,350,000
LEC Central Office Switches									
RHC Equal Access	8,751	$656,325,000							
RHC Non-Equal Access	721	$7,210,000							
Independent Equal Access	8,061	$604,575,000							
Independent Non-Equal Access	4,103	$41,030,000							
Calls using BPP	1,935,242,105		$290,286,316						
Minutes of Use Via BPP	14,445,200,000	$24,075,333	$63,703,332						
LEC OSS Switches	184	$184,000,000							
Larger IXCs	NA	$94,000,000		$147,341,040	$125,016,640				
Smaller IXCs and OSPs	NA	$26,000,000							
CAP switches	50	$3,750,000	$375,000						
Cellular/PCS Carrier Switches	200	$15,000,000	$1,500,000			$36,250,500	$5,712,200	$14,646,667	$5,858,667
Consumer Surplus Loss	NA								$136,424,680
Total		$1,655,965,333	$355,864,648	$147,341,040	$125,016,640	$127,206,750	$12,878,450	$51,396,667	$149,633,346

Total one time costs	$1,981,909,790	
Total recurring costs	$643,393,084	per year
Total annualized costs	$1,156,479,907	per year
Cost per call routed using BPP	$0.60	per call
Cost per "away-from-home" BPP call	$1.88	per call
Cost per minute of BPP traffic	$0.08	per minute
Cost per "away-from-home" BPP minute of use	$0.25	per minute
Network costs for "away-from-home" BPP calls	$1.38	per call
LEC network cost for "away-from-home" BPP calls	$1.31	per call
Total cost per access line	$0.67	per month
LEC network cost per access line	$0.47	per month

OSP traffic division under this scenario

Category	Annual Minutes	Calls	Value
BPP at home	9,849,000,000	1,319,483,254	$3,348,660,000
BPP away from home	4,596,200,000	615,758,852	$1,562,708,000
Dial around (access code)	18,384,800,000	2,463,035,407	$6,250,832,000
Total OSP	32,830,000,000	4,398,277,512	$11,162,200,000
Total BPP	14,445,200,000	1,935,242,105	$4,911,368,000

As one would expect, the cost-per-benefitted-call explodes as the absolute number of away-from-home BPP calls drops and the total costs of BPP drop significantly. In this scenario the cost per away-from-home BPP call rises to almost two dollars. At 19 cents per minute higher charges for third-tier OSPs, the average 7.5 minute OSP call imposes total higher charges of $1.42 on roughly one-eighth of away-from-home OSP calls.[26] That is, costs go up by two dollars on **all** away-from-home BPP calls in order to save about $1.50 on about one-eighth of away-from-home calls.

B. The Anti-Nynex Scenario — Low Dial-Around with BPP

Of course, Nynex might be wrong. Perhaps with the convenience of BPP, frequent travelers who have been dialing AT&T's 10288 or MCI's 1-800-COLLECT for four years would quickly switch to 0+ dialing. If so, the fraction of traffic using dial-around could be far smaller than the Commission considered. This might be especially likely if costs of BPP are not passed on to users of BPP service. If we keep all other variables in our model at the base-case level, but shrink dial-around to 20 percent, we get the results shown on the next page.

[26] See FNPRM, footnote 24 "We estimate that the combined market share of third tier OSPs will drop by about one-third from 12.7% of the minutes for away from home calls to 8.5% of away from home minutes."

Strategic Policy Research — BPP Total Social Costs Worksheet Scenario: Low Dial Around (20%)

version of 09:29 13-Sep-94

Input Data

Short Name	Value	Description
OSPMOU	32,830,000,000	Total Minutes of OSP Traffic (32.8 billion follows the growth rate in FNPRN, note 25 and 25.5 billion minutes reported in 1991 TOSCIA Report)
BPPCallDuration	7.46	Average Duration of a BPP Call. Our value of 7.46 is based on Lande report, Table 4 (20.9/2.8) (minutes/calls)
BPPCallPrice	$0.34	Price per minute to end-user of calls placed under BPP
FAwayFromHomeOSP	70.0%	Fraction of OSP calls that are made "away-from-home"
FDialAround	20.0%	Fraction of "away-from-home" calls that dial-around 0+ access (we assume no dial around at home)
AccessLines	143,325,000.00	Total number of LEC Access lines (from USTA 93, p. 2)
RHCEA	8,751	Number of RHC equal access switches (from USTA 93, p. 12)
RHCnotEA	721	Number of RHC non equal access switches (from USTA 93, p. 12)
IndEA	8,061	Number of independent equal access switches (from USTA 93, p. 12)
IndnotEA	4,103	Number of independent non equal access switches (from USTA 93, p. 12)
LECOSSSW	184	Number of LEC OSS switches (SPR estimate one per LATA plus 20)
OT$perSPCOffice	$75,000	One-time expenditures required to upgrade a stored-program controlled office to BPP (calculation assumes SPC office= EA office)
OT$pernonSPCOffice	$10,000	One-time expenditures required to upgrade a non stored-program controlled office to BPP
MOUperTrunk	5,000	Minutes of traffic carried by an average end-office -- OSS trunk in a month
OT$perTrunk	$100	The one-time (rearrangement) costs for added voice-grade trunk from an end-office to a OSS switch
OT$perLECOSSSwitch	$1,000,000	The one-time costs of upgrading a LEC OSS switch to support BPP
AddSetupCostsperBPPCall	$0.15	The average additional costs imposed by the process of setting-up a BPP call
AddCostPerBPPMou	$0.0044	The average additional per minute BPP cost. $0.0044 = 0.49 cents per minute (Bell Atlantic tandem cost) times 0.9
NetCostLargerIXC	$94,000,000	One-time network costs for larger IXCs, see FCC FNPRMM para 28
NetCostSmallIXCs	$26,000,000	One-time network costs for smaller IXCs, see FCC FNPRMM para 28
CapSwitches	50	Number of CAP switches that will have to be modified by 1997
CellularPCSSwitches	200	Number of cellular, PCS, SMRS switches that will have to be upgraded or modified by 1997
AnnualGrowthRateCellularPCSswitches	0.1	The assumed growth rate for Cellular/PCS/CAP switches.
OT$IXCMarketing	3.0%	The IXC marketing expense associated with the balloting/open season for 0+ presubscription as a fraction of five years BPP revenues for customers who return ballots
IXCMarketingFOSPCallRevs	8.0%	Continuing IXC marketing expense as a fraction of total BPP revenues
CustperLoop	0.77	The ratio of customers to access lines (allowance for multi-loop customers)
CostBallotSent	$0.50	The cost to a LEC for each ballot mailed
CostBallotReturned	$0.50	The cost to a LEC for processing each returned ballot
CostperInquiry	$1.50	The cost to the LEC for processing each telephone inquiry regarding the 0+ equal access ballot process
FSubsReturningBallot	20.0%	The fraction of subscribers returning ballots
FSubsMakingInquiry	15.0%	The fraction of subscribers inquiring about the 0+ ballot process
LECAnnualChurn	20.0%	The fraction of LEC customers who subscribe anew to service each year (moves, etc.)
CellularAnnualChurn	40.0%	The fraction of cellular customers who subscribe anew to service each year (moves, etc.), change cellular carriers or change IXCs
CellularCustomers	43,940,000	The number of cellular/PCS customers (assume 30 percent growth for three years from 20 million base)
ConsumerTime$	$10	The value of consumer's time (dollars/hour)
ConsumerMinperBallot	2	The average number of minutes it takes a consumer to read and understand a ballot, and, if motivated, fill out it out, insert and mail and/or inquire about ballot.
AmortFactor	0.3	The amortization/depreciation factor used to convert one-time network expenses to annualized costs
SocialInterest	0.05	The amortization factor used to convert other one-time expenses to annual charges.
ElasticityEffectFactor	0.16	The elasticity effect coefficient -- the ratio of consumer welfare loss from increased long-distance charges to increases in access charges

Results

Cost-Causing Element	Number	Network Costs		Marketing Costs		Administrative Costs		Consumer Response	
		One Time	Recurring	One Time	Recurring	One Time	Recurring	One Time	Recurring
Access Lines	143,325,000					$90,956,250	$7,166,250	$36,750,000	$7,350,000
LEC Central Office Switches									
RHC Equal Access	8,751	$656,325,000							
RHC Non-Equal Access	721	$7,210,000							
Independent Equal Access	8,061	$604,575,000							
Independent Non-Equal Access	4,103	$41,030,000							
Calls using BPP	3,782,518,660		$567,377,799						
Minutes of Use Via BPP	28,233,800,000	$47,056,333	$124,511,058						
LEC OSS Switches	184	$184,000,000							
Larger IXCs	NA	$94,000,000		$287,984,760	$500,066,560				
Smaller IXCs and OSPs	NA	$26,000,000							
CAP switches	50	$3,750,000	$375,000						
Cellular/PCS Carrier Switches	200	$15,000,000	$1,500,000			$36,250,500	$5,712,200	$14,646,667	$5,858,667
Consumer Surplus Loss	NA								$191,591,641
Total		$1,678,946,333	$693,763,857	$287,984,760	$500,066,560	$127,206,750	$12,878,450	$51,396,667	$204,800,308

Total one time costs	$2,145,534,510	
Total recurring costs	$1,411,509,175	per year
Total annualized costs	$1,938,522,484	per year
Cost per call routed using BPP	$0.51	per call
Cost per "away-from-home" BPP call	$0.79	per call
Cost per minute of BPP traffic	$0.07	per minute
Cost per "away-from-home" BPP minute of use	$0.11	per minute
Network costs for "away-from-home" BPP calls	$0.49	per call
LEC network cost for "away-from-home" BPP calls	$0.47	per call
Total cost per access line	$1.13	per month
LEC network cost per access line	$0.67	per month

OSP traffic division under this scenario

Category	Annual Minutes	Calls	Value
BPP at home	9,849,000,000	1,319,483,254	$3,348,660,000
BPP away from home	18,384,800,000	2,463,035,407	$6,250,832,000
Dial around (access code)	4,596,200,000	615,758,852	$1,562,708,000
Total OSP	32,830,000,000	4,398,277,512	$11,162,200,000
Total BPP	28,233,800,000	3,782,518,660	$9,599,492,000

As would be expected, the cost-per-benefitted-call decreases as the fixed costs are spread over more traffic. But, the overall social costs rise. The network must handle more BPP calls and minutes. Decreasing dial-around increases the dollars targeted by IXC marketing associated with BPP usage. Hence, we expect network and marketing costs to rise, leading to a rise in total costs. Indeed, that is just what we observe. While the costs-per-benefitted-call falls to $0.79 the total annualized costs rise to almost $2 billion!

C. Artificially Low-Cost Case

Another interesting question is how our assumptions must be altered in order to drive the costs estimated by our model close to the benefits estimated by the FCC. The Commission estimated two major quantifiable benefits from BPP — $280 million in lower OSP charges and $340 million in reduced commission payments by OSPs — for total benefits of $620 million per year. Assuming, for the sake of argument, that these are correct measures of benefits, what assumptions would push annual costs to the $600-$700 million per year level using our model?

If we make the following adjustments to our model:

- reduce the estimated upgrade costs per EA switch to $37,500,
- reduce the upgrade costs for non-EA switches to $0,
- reduce the added call setup costs to five cents,
- reduce the added costs-per-minute-of-use by half to $0.0022,
- reduce the IXC one-time marketing expense to 0, and
- reduce the continuing IXC marketing allowance to four percent of BPP sales,

recurring costs become $451 million and annualized costs fall to $754 million.

But, these are heroic assumptions. Almost all parties project far higher switch upgrade costs. We believe that it is indisputable that the two-switch/two-operator problems and the additional database inquires will add to the costs of call set-up under BPP. We expect the added cost of BPP usage to exceed tandem usage costs, not run at half the level of tandem usage. And, we believe that eight percent is on the low end of IXC marketing revenues as a percent BPP

revenues — so four percent is far too low an allowance for this cost. Nevertheless, even the combination of these assumptions (each of which is individually questionable and which seem highly unlikely to all be true at the same time) does not reduce costs to the level of benefits estimated by the Commission.

The table on the next page shows our model under these low-cost assumptions.

Strategic Policy Research — BPP Total Social Costs Worksheet Scenario: Extreme Low-cost Assumptions

version of 09:33 13-Sep-94

Input Data

Short Name	Value	Description
)SPMOU	32,830,000,000	Total Minutes of OSP Traffic (32.8 billion follows the growth rate in FNPRN, note 25 and 25.5 billion minutes reported in 1991 TOSCIA Report)
3PPCallDuration	7.46	Average Duration of a BPP Call. Our value of 7.46 is based on Lande report, Table 4 (20.9/2.8) (minutes/calls)
3PPCallPrice	$0.34	Price per minute to end-user of calls placed under BPP
AwayFromHomeOSP	70.0%	Fraction of OSP calls that are made "away-from-home"
DialAround	50.0%	Fraction of "away-from-home" calls that dial-around 0+ access (we assume no dial around at home)
\ccessLines	143,325,000.00	Total number of LEC Access lines (from USTA 93, p. 2)
RHCEA	8,751	Number of RHC equal access switches (from USTA 93, p. 12)
RHCnotEA	721	Number of RHC non equal access switches (from USTA 93, p. 12)
ndEA	8,061	Number of independent equal access switches (from USTA 93, p. 12)
ndnotEA	4,103	Number of independent non equal access switches (from USTA 93, p. 12)
ECOSSSW	184	Number of LEC OSS switches (SPR estimate one per LATA plus 20)
)T$perSPCOffice	$37,500	One-time expenditures required to upgrade a stored-program controlled office to BPP (calculation assumes SPC office= EA office)
)T$pernonSPCOffice	$0	One-time expenditures required to upgrade a non stored-program controlled office to BPP
MOUperTrunk	5,000	Minutes of traffic carried by an average end-office -- OSS trunk in a month
)T$perTrunk	$100	The one-time (rearrangement) costs for added voice-grade trunk from an end-office to a OSS switch
)T$perLECOSSSwitch	$1,000,000	The one-time costs of upgrading a LEC OSS switch to support BPP
ddSetupCostsperBPPCall	$0.05	The average additional costs imposed by the process of setting-up a BPP call
ddCostPerBPPMou	$0.0022	The average additional per minute BPP cost. $0.0044 = 0.49 cents per minute (Bell Atlantic tandem cost) times 0.9
letCostLargerIXC	$94,000,000	One-time network costs for larger IXCs, see FCC FNPRMM para 28
letCostSmallIXCs	$26,000,000	One-time network costs for smaller IXCs, see FCC FNPRMM para 28
apSwitches	50	Number of CAP switches that will have to be modified by 1997
ellularPCSSwitches	200	Number of cellular, PCS, SMRS switches that will have to be upgraded or modified by 1997
nnualGrowthRateCellularPCSswitches	0.1	The assumed growth rate for Cellular/PCS/CAP switches.
)T$IXCMarketing	0.0%	The IXC marketing expense associated with the balloting/open season for 0+ presubscription as a fraction of five years BPP revenues for customers who return ballots
CMarketingFOSPCallRevs	4.0%	Continuing IXC marketing expense as a fraction of total BPP revenues
ustperLoop	0.77	The ratio of customers to access lines (allowance for multi-loop customers)
ostBallotSent	$0.50	The cost to a LEC for each ballot mailed
ostBallotReturned	$0.50	The cost to a LEC for processing each returned ballot
ostperInquiry	$1.50	The cost to the LEC for processing each telephone inquiry regarding the 0+ equal access ballot process
SubsReturningBallot	20.0%	The fraction of subscribers returning ballots
SubsMakingInquiry	15.0%	The fraction of subscribers inquiring about the 0+ ballot process
ECAnnualChurn	20.0%	The fraction of LEC customers who subscribe anew to service each year (moves, etc.)
ellularAnnualChurn	40.0%	The fraction of cellular customers who subscribe anew to service each year (moves, etc.), change cellular carriers or change IXCs
ellularCustomers	43,940,000	The number of cellular/PCS customers (assume 30 percent growth for three years from 20 million base)
onsumerTime$	$10	The value of consumer's time (dollars/hour)
onsumerMinperBallot	2	The average number of minutes it takes a consumer to read and understand a ballot, and, if motivated, fill out it out, insert and mail and/or inquire about ballot.
mortFactor	0.3	The amortization/depreciation factor used to convert one-time network expenses to annualized costs
ocialInterest	0.05	The amortization factor used to convert other one-time expenses to annual charges.
asticityEffectFactor	0.16	The elasticity effect coefficient -- the ratio of consumer welfare loss from increased long-distance charges to increases in access charges

esults

ost-Causing Element	Number	Network Costs		Marketing Costs		Administrative Costs		Consumer Response	
		One Time	Recurring	One Time	Recurring	One Time	Recurring	One Time	Recurring
ccess Lines	143,325,000					$90,956,250	$7,166,250	$36,750,000	$7,350,000
EC Central Office Switches									
RHC Equal Access	8,751	$328,162,500							
RHC Non-Equal Access	721	$0							
Independent Equal Access	8,061	$302,287,500							
Independent Non-Equal Access	4,103	$0							
ills using BPP	2,858,880,383		$142,944,019						
nutes of Use Via BPP	21,339,500,000	$35,565,833	$47,053,598						
C OSS Switches	184	$184,000,000							
rger IXCs	NA	$94,000,000		$0	$156,270,800				
naller IXCs and OSPs	NA	$26,000,000							
AP switches	50	$1,875,000	$187,500						
llular/PCS Carrier Switches	200	$7,500,000	$750,000			$36,250,500	$5,712,200	$14,646,667	$5,858,667
nsumer Surplus Loss	NA								$77,560,379
tal		$979,390,833	$190,935,117	$0	$156,270,800	$127,206,750	$12,878,450	$51,396,667	$90,769,045

tal one time costs	$1,157,994,250	
tal recurring costs	$450,853,412	per year
tal annualized costs	$753,600,833	per year
st per call routed using BPP	$0.26	per call
st per "away-from-home" BPP call	$0.49	per call
st per minute of BPP traffic	$0.04	per minute
st per "away-from-home" BPP minute of use	$0.07	per minute
twork costs for "away-from-home" BPP calls	$0.31	per call
C network cost for "away-from-home" BPP calls	$0.29	per call
tal cost per access line	$0.44	per month
C network cost per access line	$0.26	per month

OSP traffic division under this scenario

Category	Annual Minutes	Calls	Value
BPP at home	9,849,000,000	1,319,483,254	$3,348,660,000
BPP away from home	11,490,500,000	1,539,397,129	$3,906,770,000
Dial around (access code)	11,490,500,000	1,539,397,129	$3,906,770,000
Total OSP	32,830,000,000	4,398,277,512	$11,162,200,000
Total BPP	21,339,500,000	2,858,880,383	$7,255,430,000

D. The No-Balloting Scenario

Another interesting scenario is given by asking what are the effects of eliminating the costs associated with balloting? We can do this easily in our spreadsheet by setting the various costs factors associated with balloting to zero.

Under our model dropping balloting saves roughly $400 million in one-time costs but decreases only slightly the annual recurring costs. These savings come from three sources — LECs do not have to undertake the expensive balloting process, consumers do not receive the ballots and therefore do not have to read them or think about them, and IXCs have no motive to put on a big marketing push to sway the balloting process. Altogether these add up to substantial savings.

The table on the next page shows our model under the no-balloting assumptions.

Strategic Policy Research — BPP Total Social Costs Worksheet Scenario: No Balloting

version of 09:36 13-Sep-94

Input Data

Short Name	Value	Description
OSPMOU	32,830,000,000	Total Minutes of OSP Traffic (32.8 billion follows the growth rate in FNPRN, note 25 and 25.5 billion minutes reported in 1991 TOSCIA Report)
BPPCallDuration	7.46	Average Duration of a BPP Call. Our value of 7.46 is based on Lande report, Table 4 (20.9/2.8) (minutes/calls)
BPPCallPrice	$0.34	Price per minute to end-user of calls placed under BPP
FAwayFromHomeOSP	70.0%	Fraction of OSP calls that are made "away-from-home"
FDialAround	50.0%	Fraction of "away-from-home" calls that dial-around 0+ access (we assume no dial around at home)
AccessLines	143,325,000.00	Total number of LEC Access lines (from USTA 93, p. 2)
RHCEA	8,751	Number of RHC equal access switches (from USTA 93, p. 12)
RHCnotEA	721	Number of RHC non equal access switches (from USTA 93, p. 12)
IndEA	8,061	Number of independent equal access switches (from USTA 93, p. 12)
IndnotEA	4,103	Number of independent non equal access switches (from USTA 93, p. 12)
LECOSSSW	184	Number of LEC OSS switches (SPR estimate one per LATA plus 20)
OT$perSPCOffice	$75,000	One-time expenditures required to upgrade a stored-program controlled office to BPP (calculation assumes SPC office= EA office)
OT$pernonSPCOffice	$10,000	One-time expenditures required to upgrade a non stored-program controlled office to BPP
MOUperTrunk	5,000	Minutes of traffic carried by an average end-office -- OSS trunk in a month
OT$perTrunk	$100	The one-time (rearrangement) costs for added voice-grade trunk from an end-office to a OSS switch
OT$perLECOSSSwitch	$1,000,000	The one-time costs of upgrading a LEC OSS switch to support BPP
AddSetupCostsperBPPCall	$0.15	The average additional costs imposed by the process of setting-up a BPP call
AddCostPerBPPMou	$0.0044	The average additional per minute BPP cost. $0.0044 = 0.49 cents per minute (Bell Atlantic tandem cost) times 0.9
NetCostLargerIXC	$94,000,000	One-time network costs for larger IXCs, see FCC FNPRMM para 28
NetCostSmallIXCs	$26,000,000	One-time network costs for smaller IXCs, see FCC FNPRMM para 28
CapSwitches	50	Number of CAP switches that will have to be modified by 1997
CellularPCSSwitches	200	Number of cellular, PCS, SMRS switches that will have to be upgraded or modified by 1997
AnnualGrowthRateCellularPCSswitches	0.1	The assumed growth rate for Cellular/PCS/CAP switches.
OT$IXCMarketing		The IXC marketing expense associated with the balloting/open season for 0+ presubscription as a fraction of five years BPP revenues for customers who return ballots
IXCMarketingFOSPCallRevs	8.0%	Continuing IXC marketing expense as a fraction of total BPP revenues
CustperLoop	0.77	The ratio of customers to access lines (allowance for multi-loop customers)
CostBallotSent		The cost to a LEC for each ballot mailed
CostBallotReturned		The cost to a LEC for processing each returned ballot
CostperInquiry		The cost to the LEC for processing each telephone inquiry regarding the 0+ equal access ballot process
FSubsReturningBallot		The fraction of subscribers returning ballots
FSubsMakingInquiry		The fraction of subscribers inquiring about the 0+ ballot process
LECAnnualChurn	20.0%	The fraction of LEC customers who subscribe anew to service each year (moves, etc.)
CellularAnnualChurn	40.0%	The fraction of cellular customers who subscribe anew to service each year (moves, etc.), change cellular carriers or change IXCs
CellularCustomers	43,940,000	The number of cellular/PCS customers (assume 30 percent growth for three years from 20 million base)
ConsumerTime$		The value of consumer's time (dollars/hour)
ConsumerMinperBallot		The average number of minutes it takes a consumer to read and understand a ballot, and, if motivated, fill out it out, insert and mail and/or inquire about ballot.
AmortFactor	0.3	The amortization/depreciation factor used to convert one-time network expenses to annualized costs
SocialInterest	0.05	The amortization factor used to convert other one-time expenses to annual charges.
ElasticityEffectFactor	0.16	The elasticity effect coefficient -- the ratio of consumer welfare loss from increased long-distance charges to increases in access charges

Results

Cost-Causing Element	Number	Network Costs		Marketing Costs		Administrative Costs		Consumer Response	
		One Time	Recurring	One Time	Recurring	One Time	Recurring	One Time	Recurring
Access Lines	143,325,000								
LEC Central Office Switches									
RHC Equal Access	8,751	$656,325,000							
RHC Non-Equal Access	721	$7,210,000							
Independent Equal Access	8,061	$604,575,000							
Independent Non-Equal Access	4,103	$41,030,000							
Calls using BPP	2,858,880,383		$428,832,057						
Minutes of Use Via BPP	21,339,500,000	$35,565,833	$94,107,195						
LEC OSS Switches	184	$184,000,000							
Larger IXCs	NA	$94,000,000			$312,541,600				
Smaller IXCs and OSPs	NA	$26,000,000							
CAP switches	50	$3,750,000	$375,000						
Cellular/PCS Carrier Switches	200	$15,000,000	$1,500,000						
Consumer Surplus Loss	NA								$164,008,160
Total		$1,887,455,833	$524,814,252		$312,541,600				$164,008,160

Total one time costs	$1,667,455,833	
Total recurring costs	$1,001,364,013	per year
Total annualized costs	$1,501,600,763	per year
Cost per call routed using BPP	$0.53	per call
Cost per "away-from-home" BPP call	$0.98	per call
Cost per minute of BPP traffic	$0.07	per minute
Cost per "away-from-home" BPP minute of use	$0.13	per minute
Network costs for "away-from-home" BPP calls	$0.67	per call
LEC network cost for "away-from-home" BPP calls	$0.64	per call
Total cost per access line	$0.87	per month
LEC network cost per access line	$0.57	per month

OSP traffic division under this scenario

Category	Annual Minutes	Calls	Value
BPP at home	9,849,000,000	1,319,483,254	$3,348,660,000
BPP away from home	11,490,500,000	1,539,397,129	$3,906,770,000
Dial around (access code)	11,490,500,000	1,539,397,129	$3,906,770,000
Total OSP	32,830,000,000	4,398,277,512	$11,162,200,000
Total BPP	21,339,500,000	2,858,880,383	$7,255,430,000

E. Pessimistic Scenario

We can also consider a less favorable scenario — one which assumes that variables will take values that inflate the per-call costs of BPP. In particular, let us assume that:

- OSP traffic declines slightly from 1991 levels rather than grows, due to the expanded use of cellular and PCS,
- Dial-around rises to the 80 percent level forecast by Nynex,
- Upgrading a SPC central office costs $100,000 rather than $75,000, and
- IXCs choose to spend 16 percent of BPP revenues for continuing marketing efforts, rather than the 8 percent of our base case.

In contrast to our low-cost case, none of these assumptions seem wildly inappropriate or extreme. Rather, this scenario considers how a confluence of events, each unfavorable to the economic of BPP, can influence those economics. Under these assumptions, the cost per away-from-home BPP call soars to almost three dollars! The table on the next page shows BPP under this scenario.

Strategic Policy Research — BPP Total Social Costs Worksheet Scenario: Pessimistic - costs, dial around, usage

version of 17:22 13-Sep-94

Input Data

Short Name	Value	Description
SPMOU	21,886,644,780	Total Minutes of OSP Traffic (32.8 billion follows the growth rate in FNPRN, note 25 and 25.5 billion minutes reported in 1991 TOSCIA Report)
PPCallDuration	7.46	Average Duration of a BPP Call. Our value of 7.46 is based on Lande report, Table 4 (20.9/2.8) (minutes/calls)
PPCallPrice	$0.34	Price per minute to end-user of calls placed under BPP
AwayFromHomeOSP	70.0%	Fraction of OSP calls that are made "away-from-home"
DialAround	80.0%	Fraction of "away-from-home" calls that dial-around 0+ access (we assume no dial around at home)
ccessLines	143,325,000.00	Total number of LEC Access lines (from USTA 93, p. 2)
HCEA	8,751	Number of RHC equal access switches (from USTA 93, p. 12)
HCnotEA	721	Number of RHC non equal access switches (from USTA 93, p. 12)
dEA	8,061	Number of independent equal access switches (from USTA 93, p. 12)
dnotEA	4,103	Number of independent non equal access switches (from USTA 93, p. 12)
ECOSSSW	184	Number of LEC OSS switches (SPR estimate one per LATA plus 20)
T$perSPCOffice	$100,000	One-time expenditures required to upgrade a stored-program controlled office to BPP (calculation assumes SPC office= EA office)
T$pernonSPCOffice	$10,000	One-time expenditures required to upgrade a non stored-program controlled office to BPP
OUperTrunk	5,000	Minutes of traffic carried by an average end-office -- OSS trunk in a month
T$perTrunk	$100	The one-time (rearrangement) costs for added voice-grade trunk from an end-office to a OSS switch
T$perLECOSSSwitch	$1,000,000	The one-time costs of upgrading a LEC OSS switch to support BPP
dSetupCostsperBPPCall	$0.15	The average additional costs imposed by the process of setting-up a BPP call
dCostPerBPPMou	$0.0044	The average additional per minute BPP cost. $0.0044 = 0.49 cents per minute (Bell Atlantic tandem cost) times 0.9
tCostLargerIXC	$94,000,000	One-time network costs for larger IXCs, see FCC FNPRMM para 28
tCostSmallIXCs	$26,000,000	One-time network costs for smaller IXCs, see FCC FNPRMM para 28
apSwitches	50	Number of CAP switches that will have to be modified by 1997
ellularPCSSwitches	200	Number of cellular, PCS, SMRS switches that will have to be upgraded or modified by 1997
nualGrowthRateCellularPCSswitches	0.1	The assumed growth rate for Cellular/PCS/CAP switches.
T$IXCMarketing	3.0%	The IXC marketing expense associated with the balloting/open season for 0+ presubscription as a fraction of five years BPP revenues for customers who return ballots
CMarketingFOSPCallRevs	16.0%	Continuing IXC marketing expense as a fraction of total BPP revenues
stperLoop	0.77	The ratio of customers to access lines (allowance for multi-loop customers)
stBallotSent	$0.50	The cost to a LEC for each ballot mailed
stBallotReturned	$0.50	The cost to a LEC for processing each returned ballot
stperInquiry	$1.50	The cost to the LEC for processing each telephone inquiry regarding the 0+ equal access ballot process
ubsReturningBallot	20.0%	The fraction of subscribers returning ballots
ubsMakingInquiry	15.0%	The fraction of subscribers inquiring about the 0+ ballot process
CAnnualChurn	20.0%	The fraction of LEC customers who subscribe anew to service each year (moves, etc.)
ellularAnnualChurn	40.0%	The fraction of cellular customers who subscribe anew to service each year (moves, etc.), change cellular carriers or change IXCs
ellularCustomers	43,940,000	The number of cellular/PCS customers (assume 30 percent growth for three years from 20 million base)
nsumerTime$	$10	The value of consumer's time (dollars/hour)
nsumerMinperBallot	2	The average number of minutes it takes a consumer to read and understand a ballot, and, if motivated, fill out it out, insert and mail and/or inquire about ballot.
ortFactor	0.3	The amortization/depreciation factor used to convert one-time network expenses to annualized costs
cialInterest	0.05	The amortization factor used to convert other one-time expenses to annual charges.
sticityEffectFactor	0.16	The elasticity effect coefficient -- the ratio of consumer welfare loss from increased long-distance charges to increases in access charges

Results

Cost-Causing Element	Number	Network Costs		Marketing Costs		Administrative Costs		Consumer Response	
		One Time	Recurring	One Time	Recurring	One Time	Recurring	One Time	Recurring
cess Lines	143,325,000					$90,956,250	$7,166,250	$36,750,000	$7,350,000
C Central Office Switches									
RHC Equal Access	8,751	$875,100,000							
RHC Non-Equal Access	721	$7,210,000							
ndependent Equal Access	8,061	$806,100,000							
ndependent Non-Equal Access	4,103	$41,030,000							
lls using BPP	1,290,160,113		$193,524,017						
utes of Use Via BPP	9,630,123,703	$16,050,206	$42,468,846						
C OSS Switches	184	$184,000,000							
ger IXCs	NA	$94,000,000		$98,227,262	$166,686,687				
aller IXCs and OSPs	NA	$26,000,000							
P switches	50	$5,000,000	$500,000						
lular/PCS Carrier Switches	200	$20,000,000	$2,000,000			$36,250,500	$5,712,200	$14,646,667	$5,858,667
sumer Surplus Loss	NA								$137,734,388
al		$2,074,490,206	$238,492,863	$98,227,262	$166,686,687	$127,206,750	$12,878,450	$51,396,667	$150,943,055

al one time costs	$2,351,320,885	
al recurring costs	$569,003,054	per year
al annualized costs	$1,205,191,650	per year
st per call routed using BPP	$0.93	per call
st per "away-from-home" BPP call	$2.94	per call
st per minute of BPP traffic	$0.13	per minute
st per "away-from-home" BPP minute of use	$0.39	per minute
twork costs for "away-from-home" BPP calls	$2.10	per call
C network cost for "away-from-home" BPP calls	$1.98	per call
tal cost per access line	$0.70	per month
C network cost per access line	$0.47	per month

OSP traffic division under this scenario

Category	Annual Minutes	Calls	Value
BPP at home	6,565,993,434	879,654,623	$2,232,437,768
BPP away from home	3,064,130,269	410,505,491	$1,041,804,292
Dial around (access code)	12,256,521,077	1,642,021,962	$4,167,217,166
Total OSP	21,886,644,780	2,932,182,076	$7,441,459,225
Total BPP	9,630,123,703	1,290,160,113	$3,274,242,059

F. Conclusions

Under a base-case scenario which we believe matches the assumptions in the FCC's analysis in the FNPRM, we find that the annualized costs of BPP are roughly three times greater than the benefits calculated by the FCC. We also calculated and presented the results produced by our model under five additional scenarios. Key results for these six scenarios are shown in the table below. Notice that the one-time and annualized costs for these scenarios are quite similar — with the extreme/low cost scenario an outlier on the low side.

Scenario	Total One-time Costs ($ billion)	Annualized Costs ($ billion/year)	Cost-Per-Call-Benefitted (i.e., per "away-from-home" BPP call)
Base case	$2.1	$1.5	$1.01
High (80%) dial-around	$2.0	$1.2	$1.88
Low (20%) dial-around	$2.1	$1.9	$0.79
Extreme low costs	$1.2	$0.8	$0.49
Pessimistic Scenario	$2.4	$1.2	$2.94
No Balloting	$1.7	$1.5	$0.98

We believe that one can reasonably conclude from this analysis that:

- the cost of implementing BPP will far exceed the benefits the FCC has identified. Only by using multiple assumptions favoring lower costs for BPP implementation, each implausible on its own and the combination practically impossible to accept, are we able to force the annualized costs of BPP into the same ballpark as the benefits identified by the FCC.
- if the increase in dial-around projected by Nynex and others occurs, then the BPP costs for every away-from-home call routed using BPP may exceed the excessive third-tier OSP charges which occurs today on only 12.7 percent of away-from-home calls. In a world of high dial-around, the BPP cure — which

is applied to well and sick alike — is worse than the disease which affects only the sick.

IV. Benefits of BPP

BPP permits consumers to avoid using access codes and yet ensure that their call goes over their chosen long-distance carrier. Thus, consumers can save the time and effort of learning to use access codes and the time it takes to dial them. We cannot identify any other significant public benefit.

The Commission offered its own analysis of the benefits of BPP. We feel their analysis contained two significant flaws. First, it counted the reduction in commission payments to premises owners as a benefit. Second, in calculating the reduction in commission payments, it did not properly take into account the effect that limiting the rates of third-tier OSPs would have had on commission payments. Consequently, even accepting the heart of the Commission's analysis, benefits were double-counted.

This section presents our quantitative analysis of the benefits of BPP, a further discussion and refinement of our views on commission payments, and our quantitative evaluation of the level of double counting in the FCC's analysis.

A. Possible Savings in Dialing Time

Implementation of BPP would allow consumers to avoid high OSP charges without dialing an access code. Consumers could therefore avoid the costs of learning to use access codes. (This benefit applies mostly in the future since most of today's heavy users of operator calls have learned to use access codes.) And consumers would avoid any costs associated with using access codes.

Tests we conducted at Strategic Policy Research showed that one could dial a 10XXX access sequence in about two seconds and could dial a full 800-number dial-around sequence (in particular, 1-800-COLLECT (1-800-265-5328)) in about six seconds. Interestingly enough,

we found very little difference in the total dialing time for calls that were dialed using only a 0 and calls using the 102880 access code. These latter calls only took about 1.3 seconds longer to dial.[27] Thus, at best, the time savings on an individual call will be only seconds. If routing the call first to the LEC OSS and then to the IXC OSS creates any added delays (say due to the two-operator problem or due to the added processing) then the consumer may not see any dialing and call-setup time savings at all.

If the Commission wishes to make access code dialing more efficient, it could mandate that LECs adopt an easier-to-dial access sequence. The Appendix to our earlier study describes such a sequence. No doubt, others could design similar or better access code sequences. Paralleling our analysis of BPP, we believe that this improved access code system would not justify the costs of rapid deployment.

Additionally there should be some allowance for the cost of learning to use access codes. However, we believe that it is not very time-consuming to learn to use access codes such as 1-800-CALLATT, and that only tens of millions of people need to learn this task each year — a number roughly a hundred times smaller than the number of away-from-home OSP calls. Consequently, we have not tried to develop a quantitative estimate of this cost.

B. Transfer Payments versus Social Costs

A major benefit claimed by the FCC is the reduction in commission payments from OSPs to aggregators and premises owners. We believe that the reduction in this payment is not properly regarded as a cost savings to society. Eliminating a payment from AT&T to the Metropolitan Washington Airports Authority does not reflect any reduction in resource consumption. Indeed, if the number of pay phones at the airport stays the same, there would be no change in resource consumption whatsoever. In such a case, the payment by the OSP does not measure a true social cost — i.e., a consumption of society's resources.

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[27] Time was measured using a digital stopwatch that was started before the first digit was dialed and was stopped upon hearing the "bong" and the AT&T branding prompt.